The family Nanorchestidae Grandjean (Acari: Prostigmata) with descriptions of new species from South African soils

by

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INTRODUCTION

Mites of the family Nanorchestidae have a worldwide distribution for they are known to occur in European, North American and Antarctic soils. Recent soil ecological studies in South Africa have shown that they form a numerically important part of the local soil—inhabiting Acari. Olivier & Ryke (1965) and Loots & Ryke (1966) reported the family Nanorchestidae as occurring in large numbers in soil covered by kikuyu grass (*Pennisetum clandestinum*) and in different types of pasture soil respectively. These authors made observations on the populations of species of this family over a period of one year. Olivier & Ryke reported a relatively high number (4,334/m²) during October, which showed a substantial increase to 10,597/m² in November followed by a decrease to 2,056/m² in April, with a slight rise during February (4,555/m²). They also reported that the family Nanorchestidae (mainly the genus *Nanorchestes* Topsent & Trouessart) constituted more than 9% of the total number of soil mesofauna extracted from soil covered by kikuyu grass during the period October 1962-September 1963. On the other hand, Van den Berg & Ryke (1968), after doing a systematic-ecological survey of the acarofauna of the forest floor in Magoebaskloof, Transvaal, reported that the percentage trombidiform mites is lower in the forest soils than in the pasture soils mentioned above and that the family Nanorchestidae is one of the subordinate families in these biotopes. Loots & Ryke (1967) suggested that this phenomenon could be correlated with pore volume and moisture content of the soils. In the soils of the relatively dry steppe and savannah regions the pore spaces are small and not accessible to the larger mites, but the small trombidiform mites might be able to feed on Protozoa and Bacteria inhabiting these minute microhabitats.

The type material of the new species described in this paper is deposited in the collections of the Institute for Zoological Research, Potchefstroom University.

Family *NANORCHESTIDAE* Grandjean, 1937

Nanorchestidae Grandjean, 1937, *Bull. Mus. Hist. nat. ser.* 2, **9:** 265; Womersley, 1944: 133-134, 141-2; Baker & Wharton, 1952: 197-8.

The characters of this family are: No distinct stigmata or peritremes present at the base of the chelicerae; palpi with four movable segments and without a thumb-claw

complex; chelicerae large with opposed chelae which may be modified and bizarre; epistome large and bilobed and attached to the chelicerae; body globular to elongate with sac-like hysterosoma; body soft and unarmoured, with indications of segmentation; body setae branched to plumose; propodosoma without plates but with distinct pseudostigmata and pseudostigmatic organs; eyes present; tarsi without true claws but possessing clawlike empodia.

Genus *SPELEORCHESTES* Trägårdh, 1909

Speleorchestes Trägårdh, 1909, *Ark. Zool.* **6**: 2-3; Thor & Willmann, 1941: 158-9.

This genus can be recognised by the following characters: Very small, soft-bodied mites with a yellowish to pale red colour when fixed in 70% alcohol; body elongate with a sacciform hysterosoma; dorsally, the hysterosoma is covered by densely plumose fan-shaped setae which are very numerous posteriorly; the gnathosoma, propodosoma and hysterosoma are distinctly separated; the propodosoma bears two pairs of long finely ciliated sensilla, four pairs of short plumose setae, a pair of laterally situated eyes and a pair of postocular bodies; the chelicerae are large and chelate; the epistome is large and bilobed; the palp consists of four movable segments with the palpal tarsus bearing terminally two rodlike setae situated on blunt tubercles; the legs all have six segments with femora I, III and IV divided into a basi- and telo-femur; all tarsi with an empodial claw; adults with three pairs of genital suckers.

Type species: *Speleorchestes formicorum* Trägårdh, 1909.

Key to the South African species of Speleorchestes

1 Posterior pair of sensilla lanceolateciliate . . . . . **potchefstroomensis**
— Both pairs of sensilla fine and ciliate 2
2 Hysterosoma with three pairs of indistinct epidermal folds which do not divide the hysterosoma into sections . . . . . **meyerae**
— Hysterosoma dorsally divided into three sections 3
3 Propodosoma with two pairs of sensillae and four pairs of short plumose setae; hysterosomal setae robust; lateral margins of chelicerae concave; palp tarsus provided with two terminal rodlike setae and seven finely ciliated setae. . . . . **natulus**
— Propodosoma with two pairs of sensillae and three pairs of short plumose setae; lateral margins of chelicerae straight to slightly convex; palp tarsus provided with six setae **termitophilus**

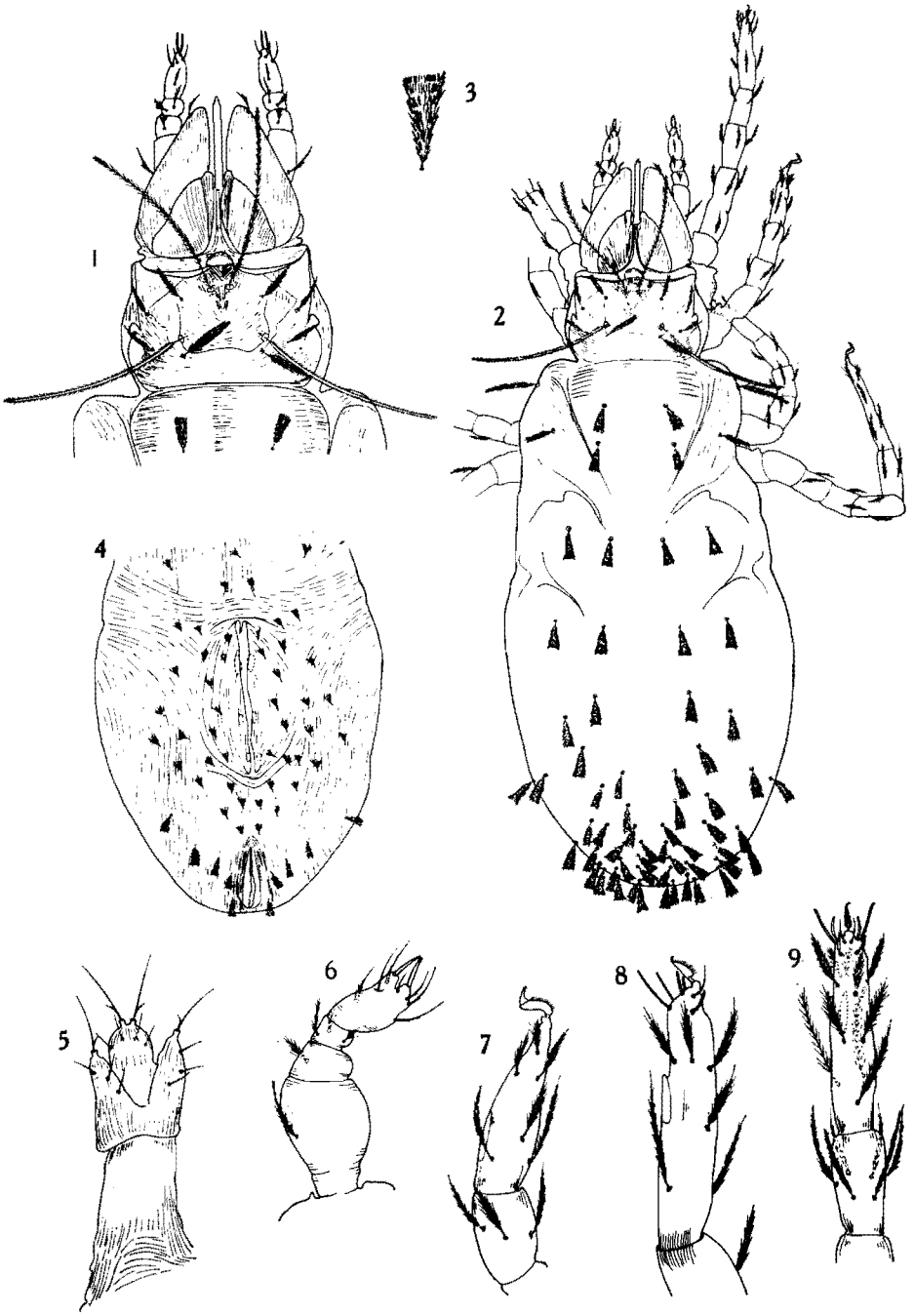
Speleorchestes potchefstroomensis spec. nov., figs 1-9

This new species may be recognised by the posterior sensilla which are lanceolate and ciliate.

FEMALE (figs. 1-9): Dimensions of holotype: length of body (incl. gnathosoma) 346μ; length (excl. gnathosoma) 288μ; breadth of hysterosoma 138μ; breadth at shoulders 98μ; breadth of propodosoma 69μ; length of chelicera 50μ; length of leg I 140μ; leg II 101μ; leg III 101μ; leg IV 138μ; length of palp 55μ.

EXPLANATION OF FIGURES

Figs. 1-9. *Speleorchestes potchefstroomensis* spec. nov., female. 1. Propodosoma. 2. Dorsum. 3. Dorsal seta. 4. Venter of opisthosoma. 5. Ovipositor. 6. Palp. 7. Leg II. 8. Leg I, lateral. 9. Leg I, ventral.



Dorsum (figs. 1-3): The gnathosoma, propodosoma and hysterosoma are separated by two distinct transverse sutures. The propodosoma (fig. 1) is somewhat wider than long. It bears two pairs of relatively long sensillae, the anterior pari which is fine and delicately ciliated, while the posterior pair, which is more widely spaced is of the lanceolate-ciliate type. Four pairs of densely plumose setae, of which the posterior pair is the longest, are also present on the propodosoma. One pair of small but prominent eyes is situated on the lateral margin just behind the midline of the propodosoma. A pair of clear round postocular bodies is located immediately posterior to the eyes. A small round frontal protuberance is present on the propodosoma. The propodosomal sensory area is peculiarly shaped and striated as depicted in fig. 1.

The hysterosoma is elongated and sacciform (fig. 2) and is enormously enlarged in gravid females. The anterior margin of the hysterosoma is much wider than the propodosoma, thus forming shoulders. The hysterosoma is not segmented but possesses what appear to be merely epidermal folds. Three pairs of these folds are present which extend posteriorly but do not meet their counterpart so as to divide the hysterosoma into sections. Dorsally, the hysterosoma is provided with 32 pairs of densely plumose fan-shaped setae which are arranged more or less in transverse rows. The majority are on the posterior portion of the hysterosoma. The shape of these setae is depicted in fig. 3. The posteriorly situated setae are slightly longer than the others. The pair of humeral setae is situated laterally on the shoulders and is nearly twice as long and not as truncated as the other dorsal setae. The skin is soft with fine striae.

Venter (figs. 4-5): The transverse sutures separating the gnathosoma, propodosoma and hysterosoma are not visible ventrally. The venter is provided with 31-33 pairs of setae which are relatively smaller than those on the dorsum (fig. 4).

The anal opening is situated posteriorly. The rather large genital opening is situated midway between coxae IV and the anal opening. The genital covers are poorly defined and each bears a row of six setae next to the genital slit and a seventh seta situated further away. Three pairs of relatively small oval genital suckers, which become progressively smaller from the first to the last pair, are present. The female possesses a relatively large ovipositor, (fig. 5) which measures up to 135μ in length. It consists of two portions, viz. a proximal shaft and a distal head which is a little wider than the shaft and terminates in three lobes. Two of these lobes each bear one long terminal seta situated on a small protuberance and three shorter simple laterally situated setae. The terminal setae are basally furcate with one portion very short. The third lobe bears two long terminal setae and four shorter simple setae.

Gnathosoma (fig. 6): The palpi (fig. 6) consist of four movable segments. The palp femur is slightly enlarged and bears a plumose seta on its dorsal surface. The palp genu is provided with one seta and the tibia with three. The palp tarsus bears two terminal rodlike setae situated on blunt tubercles and seven slender setae which are less ciliate than those of the other species. The chelate chelicerae, typical for the genus, are relatively large and striate and are provided with a short plumose seta on the dorsal surface near the anterior tip and a simple curved seta lateral to this. The bilobed epistome partly conceals the bases of the chelicerae.

Legs (figs. 7-9): The legs are slender, with legs I and IV of equal length and legs II and III slightly shorter. All the legs consist of six segments. Femora I, III and IV are all divided into a basi- and telofemur. In legs III and IV the division is complete, appearing like two different segments. Dorsally, on tarsus II (fig. 7) are a microsensory

seta and an indistinctly differentiated area, which is probably related to the serpentine lines in the genus *Nanorchestes*. A similar area is present dorsally on tarsus I (figs. 8-9) which bears terminally three pairs of rodlike setae and one pair of fine setae. All the other leg setae are densely plumose. With the rodlike and sensory setae in parentheses the setal formulae for the segments of the legs are: tarsi 12 (6)-10 (1)-8-11; tibiae 6-5-3-4; genua 5-4-3-5; femora 5-3-3-4; trochanters 0-0-0-0; coxae 2-1-2-0. Both coxa I and the first palpal segment bear a short peglike seta dorsally. All tarsi bear a curved empodial claw which is partly enclosed by a feebly rayed sheath. The empodial claw of the first leg (fig. 8) is less curved and slightly smaller than the others.

MATERIAL STUDIED. ♀-Holotype and 4 ♀-paratypes from pasture soil, Potchefstroom, Tvl., ii. 1967, P. F. S. Mulder; 5 ♀-paratype from cultivated soil, Potchefstroom, Tvl., ix. 1967, P. D. Theron.

Speleorchestes meyerae spec. nov., figs 10-22

This species is closely related to *S. potchefstroomensis*. However, it differs from the latter in the following respects: Both pairs of propodosomal sensilla are fine and slightly ciliate. Empodium I is as strongly curved as the other empodia and the genital suckers are much bigger than those of the latter species. Terminally tarsus I bears one pair of rodlike setae and three pairs of short feathered setae whereas *S. potchefstroomensis* bears three pairs of rodlike setae and one pair of small fine setae. The long terminally situated setae on the ovipositor are forked basally with the smaller branch finely ciliate.

FEMALE (figs. 10-15): Dimensions of holotype: length of body (incl. gnathosoma) 369μ; length (excl. gnathosoma) 319μ; breadth of hysterosoma 212μ; breadth at shoulders 106μ; breadth of propodosoma 56μ; length of propodosoma 51μ; length of chelicera 43μ.

Dorsum (figs. 10-11): The gnathosoma, propodosoma and hysterosoma are clearly separated. The propodosoma (fig. 11) bears two pairs of relatively long sensilla which are both fine and delicately ciliate. The anterior pair measures 56μ in length with the posterior pair slightly longer. The propodosoma also bears four pairs of plumose setae of which the posterior pair is much longer and wider than the other three pairs. The pair of small salient eyes are situated on the lateral margins immediately behind the midline of the propodosoma. A pair of clear round postocular bodies is situated immediately behind the eyes. A small round frontal protuberance is present anterior to the propodosomal sensory area which is peculiarly shaped and striated as in fig. 11. The hysterosoma is elongate and sacciform and is not segmented but possesses three pairs of epidermal folds which extend posteriorly. These folds are difficult to observe in gravid females due to the swollen condition of the abdomen. The hysterosoma attains its greatest width about halfway between coxae IV and the posterior margin. The anterior margin of the hysterosoma is slightly wider than the propodosoma, thus forming shoulders. Dorsally, the hysterosoma is covered by 32 pairs of plumose fan-shaped setae. The setae are arranged more or less transversely except for the longer posterior setae which are more numerous. The pair of humeral setae is twice as long and not as truncate as the other dorsal setae. The skin is soft with fine striae.

Venter (figs. 12-13): The venter is provided with about 30 pairs of small fan-shaped setae. The anal opening is removed from the posterior edge of the body. The genital opening (fig. 12) is relatively large and possesses three pairs of big, oval genital

suckers which become progressively smaller from the first to the last pair. The genital covers are poorly defined and each is provided with a row of four setae with a fifth seta situated somewhat more laterally. The large ovipositor (fig. 13) is divided into a basal shaft and a head which terminates in three lobes each bearing the same number of setae as those of *S. potchefstroomensis*. The structure of the long bifurcate terminal setae differs from that of the latter species in that the short branch is ciliate. The holotype female has two eggs each about 140μ long while one of the paratype females has seven eggs each about 100-105μ long.

Gnathosoma (fig. 14): The palpi (fig. 14) consist of four movable segments. The palp tarsus bears two terminally situated rodlike setae and seven finely ciliate setae. The chelicerae are large and chelate. Each chelicera bears a feathered seta anterodorsally and lateral to this a simple curved seta. The epistome is large and bilobed and partly conceals the bases of the chelicerae.

Legs (fig. 15): All the legs have six segments and are slender. Femora I, III and IV resemble those of *S. potchefstroomensis*. A microsensory seta as well as a differentiated (probably sensory) area are present on both tarsus I (fig. 15) and tarsus II. Terminally, tarsus I bears two rodlike setae and six short feathered setae. With the microsensory and rodlike setae in parentheses the setal formulae for the segments of the legs are: tarsi 16 (3)-10 (1)-8-11; tibiae 6-5-3-4; genua 5-4-3-5; femora 5-3-3-4; trochanters 0-0-0-0; coxae 2-1-2-0. Both coxa I and the first segment of the palpi bear a short peglike seta dorsally. The empodial claws are all strongly curved and partly covered by a feebly rayed sheath.

MALE (fig. 16): Dimensions of allotype: length of body (incl. gnathosoma) 347μ; length (excl. gnathosoma) 293μ; breadth of hysterosoma 156μ; breadth at shoulders 114μ; breadth of propodosoma 54μ; length of chelicera 51μ;

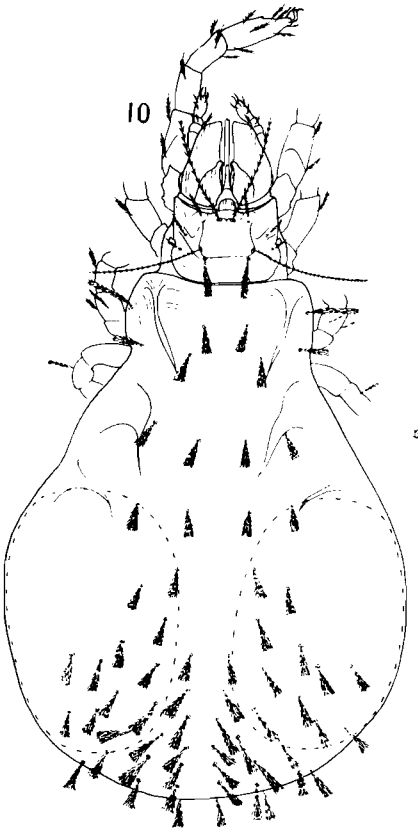
The male is essentially similar to the female except for the genital apparatus. The genital opening (fig. 16) is slightly smaller than that of the female and possesses three pairs of genital suckers and five pairs of genital setae. Just beneath the genital suckers is the male copulatory organ which has four pairs of short feathered setae. The hysterosoma is not as swollen as that of the female. The legs are similar to those of the female.

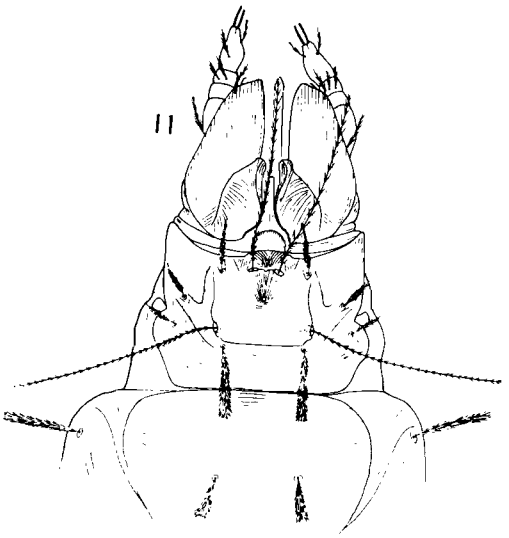
NYMPHA (figs. 17-21): Three nymphal stages were found. The dimensions of the tritonymph are as follows: length of body (incl. gnathosoma) 279μ; length (excl. gnathosoma) 228μ; breadth of hysterosoma 114μ; breadth at shoulders 103μ; breadth of propodosoma 50μ; length of chelicera 45μ.

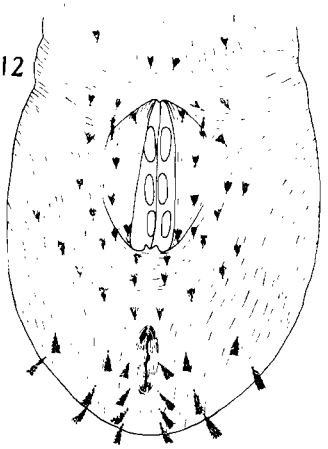
The tritonymph is basically similar to the adult but differs in the details of the ventral hysterosoma. The genital opening (fig. 17) is relatively large and possesses three pairs of genital suckers. The genital covers are poorly defined and each is provided with a row of three setae and another seta situated slightly laterally. The rest of the ventral hysterosoma possesses fewer setae than that of the adults. The legs have the same setal formulae as in the adults.

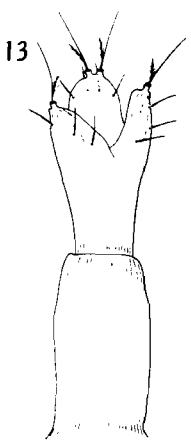
EXPLANATION OF FIGURES

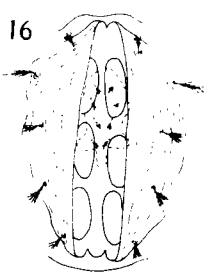
Figs. 10-16. *Speleorchestes meyerae* spec. nov. 10. Dorsum, female. 11. Propodosoma, female. 12. Venter of opisthosoma, female. 13. Ovipositor, female. 14. Palp, female. 15. Leg I, female. 16. Genital opening, male.











The dimensions of the deutonymph are as follows: length of body (incl. gnathosoma) 241μ; length (excl. gnathosoma) 204μ; breadth of hysterosoma 85μ; breadth at shoulders 93μ; breadth of propodosoma 45μ; length of chelicera 34μ;

Dorsally, the hysterosoma bears 24-26 pairs of fan-shaped plumose setae (fig. 18). The posteriorly situated anal opening is flanked by four pairs of setae. The genital opening (fig. 19) possesses two pairs of genital suckers and is flanked by two pairs of genital setae, with a third pair situated rather more laterally. With the microsensory and rodlike setae in parentheses the setal formulae for the segments of the legs are: tarsi 15 (3)-10 (1)-8-10; tibiae 6-5-3-4; genua 5-4-3-4; femora 4-2-3-3; trochanters 0-0-0-0; coxae 2-1-2-0.

The dimensions of the protonymph are as follows: length of body (incl. gnathosoma) 204μ; length (excl. gnathosoma) 172μ; breadth of hysterosoma 74μ; breadth of shoulders 86μ; breadth of propodosoma 43μ; length of chelicera 30μ.

Dorsally, the hysterosoma bears 19-20 pairs of setae (fig. 20). The posteriorly situated anal opening is flanked by four pairs of setae. The genital opening (fig. 21) possesses one pair of relatively large genital suckers and is flanked by one pair of setae. The terminal pair of rodlike setae on tarsus I is replaced by a pair of plumose setae. With the microsensory setae in parentheses the setal formulae for the legs are: tarsi 17 (1)-10 (1)-8-7; tibiae 6-5-3-3; genua 5-4-3-1; femora 4-2-3-0; trochanters 0-0-0-0; coxae 2-1-1-0.

LARVA (fig. 22): Dimensions of morphotype: length of body (incl. gnathosoma) 175μ; length (excl. gnathosoma) 147μ; breadth of hysterosoma 79μ; breadth at shoulders 77μ; length of chelicera 24μ.

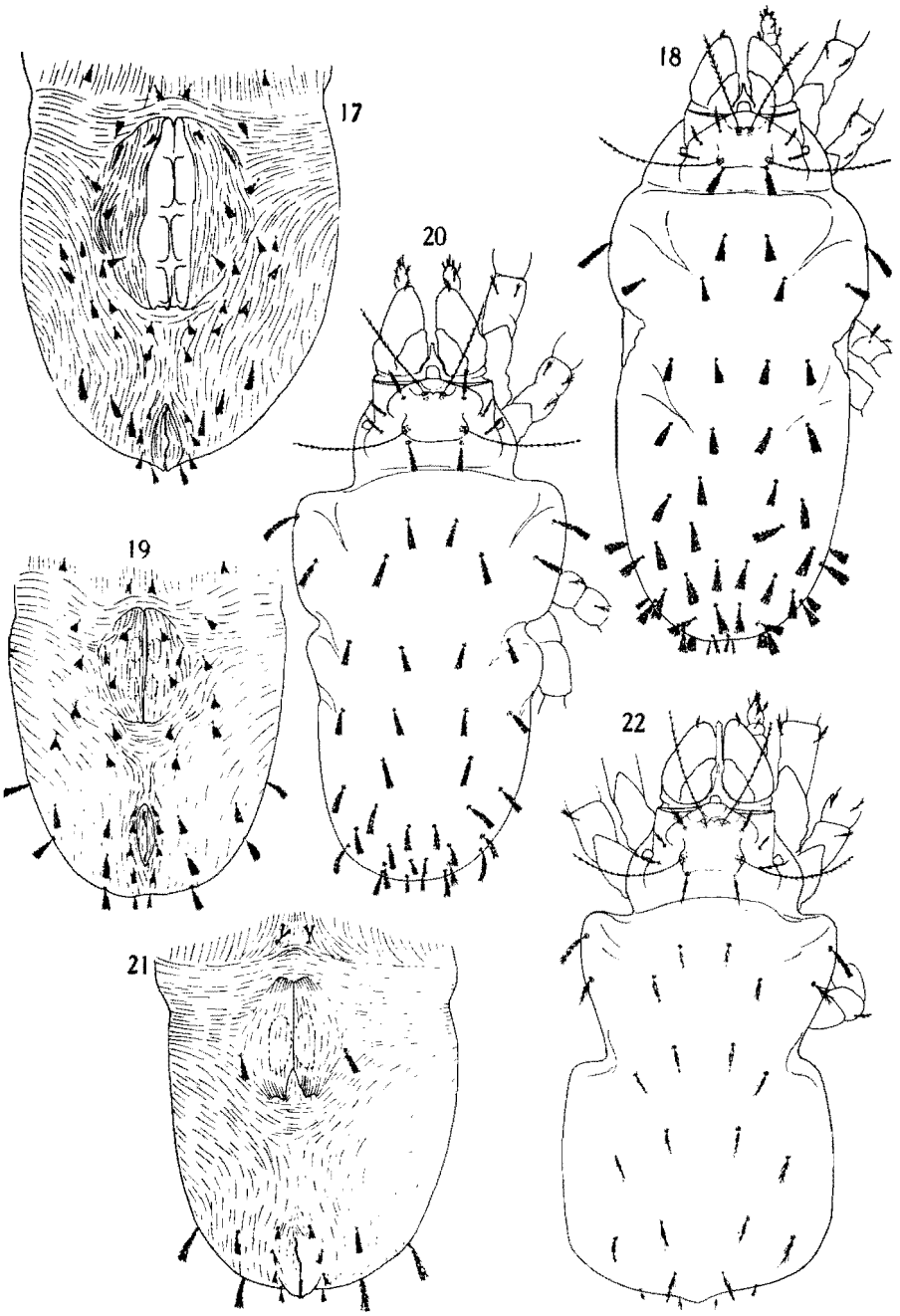
The body (fig. 22) is small and square and closely resembles that of *Nanorchestes*. The hysterosoma is covered dorsally by 13 pairs of plumose setae. The posteriorly situated anal opening is flanked by four pairs of setae. The three pairs of legs all have six segments. A pair of larval suckers are situated on coxae I. With the microsensory setae in parentheses the setal formulae for the segments of the legs are: tarsi 5 1(1)-10 (1)-8; tibiae 6-5-3; genua 5-4-3; femora 4-2-3; trochanters 0-0-0; coxae 2-1-1.

MATERIAL STUDIED. ♀-Holotype, 5 ♀- and 5 ♂-paratypes, 6 paratype nymphae and 2 paratype larvae from cultivated soil, Potchefstroom, Tvl., xi. 1967, P. D. Theron; 7 ♀-paratypes from pasture soil, Potchefstroom, Tvl., iii. 1967, P. F. S. Mulder; 2 ♀-paratypes from soil, Durban, Natal, ii. 1965, C. A. J. van Rensburg; 1 ♀-paratype from cultivated soil, Senekal, O.F.S., ix. 1967, F. W. Myburgh; 1 ♀-paratype from *Clutia* sp., Cathcart, C.P., 25. i. 1968, M. K. P. Meyer; 2 ♀-paratypes from *Elegia parviflora*, Cape Hangklip, C.P., 6. ii. 1967, W. Marais; 1 ♀-paratype from an unidentified plant, Riviersonderend, C.P., 6. ii. 1967, W. Marais.

This species is named in honour of Dr Magdalena K.P. Meyer, Plant Protection Research Institutes, Dept. of Agricultural Technical Services, Pretoria.

EXPLANATION OF FIGURES

Figs. 17-22. *Speleorchestes meyerae* spec. nov. 17. Venter of opisthosoma, tritonymph. 18. Dorsum, deutonymph. 19. Venter of opisthosoma, deutonymph. 20. Dorsum, protonymph. 21. Venter of opisthosoma, protonymph. 22. Dorsum, larva.



Speleorchestes natulus spec. nov., figs 23-26

This species is closely related to *S. meyerae* but differs in that it is smaller, with the hysterosomal setae longer and wider. The hysterosoma is divided dorsally into three sections. Further, the lateral margins of the chelicerae are concave and not straight or slightly convex as in *S. meyerae*.

FEMALE (figs. 23-26): Dimensions of holotype: length of body (incl. gnathosoma) 279μ; length (excl. gnathosoma) 220μ; breadth of hysterosoma 90μ; breadth at shoulders 71μ; breadth of propodosoma 47μ; length of propodosoma 33μ; length of chelicera 50μ.

Dorsum (figs. 23-24): The gnathosoma, propodosoma and hysterosoma are clearly separated. The propodosoma (fig. 23) is slightly broader than long. It bears the normal two pairs of relatively long sensilla which are fine and delicately ciliate. There are also four pairs of short plumose setae in the same relative positions as in *S. meyerae* with the posterior pair much longer than the others. The pair of small salient eyes are situated more laterally than are those of *S. meyerae*. A pair of postocular bodies is located posterior to the eyes. A small round frontal protuberance is present anterior to the propodosomal sensory area. The anterior margin of the hysterosoma is concave and embraces the base of the propodosoma. The hysterosoma (fig. 24) is elongate and covered by 32 pairs of plumose fan-shaped setae which are much more robust than those of *S. meyerae*. The dorsal hysterosomal setae are all of the same size except for the humeral setae which are about twice as long and less truncate. The hysterosoma is divided into three sections by two transverse sutures. The anterior suture is strongly recurved. The posterior suture, which can only be observed dorsally, is situated about midway between the anterior suture and the posterior margin of the body. The skin is soft with fine striae.

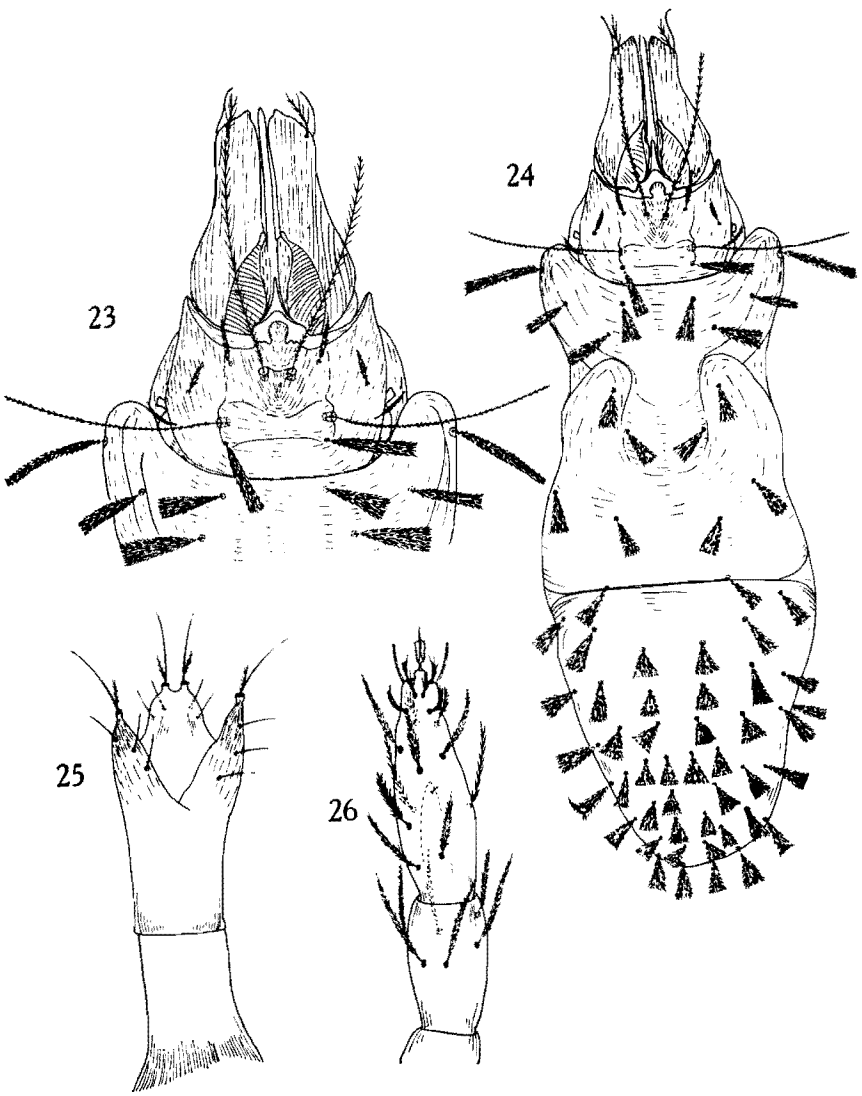
Venter (fig. 25): The venter is covered by about thirty pairs of fan-shaped setae which are relatively stouter than those of *S. meyerae*. The slitlike anal opening is situated posteriorly. The relatively large genital opening is situated midway between coxae IV and the anal opening. The genital covers are poorly defined and each bears a row of four setae with a fifth seta situated slightly more laterally. Three pairs of rather large, kidney-shaped suckers which become progressively smaller from the first to the last pair, are present. The large ovipositor (fig. 25) measures 133-149μ in length and is basically similar to that of *S. meyerae*.

Gnathosoma: The palpi consist of four movable segments. The chaetotaxy of the palp tarsus is similar to that of *S. meyerae* (fig. 14). The chelicerae are relatively large and with the lateral margins concave. Anterodorsally, each chelicera bears a plumose seta and lateral to this a simple curved seta. The epistome is large and bilobed.

Legs (fig. 26): Legs I and IV are of equal length and are much longer than legs II and III. All the legs have six segments and femora I, III and IV are similar to those of *S. potchefstroomensis*. A microsensory seta, as well as an indistinct differentiated area, is present dorsally on both tarsus I (fig. 26) and tarsus II. Terminally, tarsus I bears two rodlike setae and six short finely ciliate setae. All the other leg setae are densely plumose. With the rodlike and microsensory setae in parentheses the setal formulae for the segments of the legs are: tarsi 16 (3)-10 (1)-8-11; tibiae 6-5-3-4; genua 5-4-3-5; femora 5-3-3-4; trochanters 0-0-0-0; coxae 3-1-2-0. All tarsi bear a strongly curved empodial claw which is partly enclosed by a sheath with feeble rays thereon.

MALE: The male is essentially similar to the female and can only be distinguished by the details of the genital apparatus where four pairs of small, plumose internal setae are present.

MATERIAL STUDIED. ♀-Holotype, 2 ♀-paratypes and 2 ♂-paratypes from cultivated soil, Britstown, C.P., ii.1967, P. D. Theron.



Figs. 23-26. *Speleorchestes natulus* spec. nov., female. 23. Propodosoma. 24. Dorsum. 25. Ovipositor. 26. Leg I.

Speleorchestes termitophilus Trägårdh

Speleorchestes termitophilus Trägårdh, 1909, *Ark. Zool.* **6** (2): 10-13

According to Trägårdh (1909) the propodosoma bears two pairs of relatively long ciliate sensilla and only three pairs of short plumose setae. The sac-shaped hysterosoma is divided by two distinct transverse sutures in the anterior half. The palp tarsus is provided with six setae.

HABITAT AND LOCALITY. This species was found in a partly deserted termites' nest at Entendweni Bush, Zululand in June 1905.

Genus *NANORCHESTES* Topsent & Trouessart, 1890

Nanorchestes Topsent & Trouessart, 1890, *C. R. Acad. Sci. Paris* **3:** 891-2; Thor & Willmann, 1941: 145-6; Grandjean, 1942: 264-7; Womersley & Strandtmann, 1963: 470.

Mites of this genus are very small, globular and of a white to yellow colour. The propodosomal sensory area bears two pairs of long ciliate sensilla and three pairs of shorter plumose setae. The nomenclature as proposed by Grandjean (1942) is used for the propodosomal setae (fig. 27). The anterior sensilla represent an interesting arrangement comprising a long activating seta (*na*) and a short seta (*nf*) which curves towards the longer seta and to all appearances is the true sensory seta. This phenomenon was described for only some of the known species but it possibly occurs in all the species of this genus. One pair of small eyes and a pair of large postocular bodies are present on the propodosoma. The propodosoma and the hysterosoma are separated by a vague demarcation. The body setae are branched, tree-like and uniformly scattered over the body. The striae on the cuticle are mostly punctulate. The chelate chelicerae are large and are provided with a branched dorsal seta which may be furcate. The legs are short and thick and each tarsus bears a curved empodial claw which has fine rays on each side. Tarsi I and II, tibiae I, II and III and genu I are provided with curious serpentine lines.

Type species: *Nanorchestes amphibius* Topsent & Trouessart, 1890.

Key to the species of Nanorchestes from South African soils

1	Cheliceral setae bifurcate	2
—	Cheliceral setae not bifurcate	6
2	Epistomal striae not punctulate	3
—	Epistomal striae punctulate	5
3	Furcate cheliceral setae with the anterior directed portion about twice as long as the posterior one; protuberance on palp tarsus very small	4
—	Furcate cheliceral setae with the two forks more or less of equal length; protuberance on palp tarsus relatively large	**usualis**
4	Sensilla *nb* finely ciliate	**globosus**
—	Sensilla *nb* densely ciliate	**capensis**
5	Branches of dorsal hysterosomal setae transversely extended; with the intermandibular organ very long and protruding; setae *nm* are situated anterior to the bases of sensilla *nb* and are less than half the length of these sensilla	**exsertus**
—	Anterior hysterosomal setae much larger than the posterior ones; intermandibular organ not extending beyond the anterior tips of the chelicerae; setae *nm* are situated between the bases of sensilla *nb* and are at least two-thirds the length of these sensilla	**coatesi**
6	Palp tarsus highly specialised and provided with seven very long curved setae and a prominent protuberance bearing a long rodlike seta	**pollicaris**
—	Setae on palp tarsus moderately developed	**africanus**

Nanorchestes globosus spec. nov., figs 27-36

This species can be distinguished from the other South African species by the globular hysterosoma and the shape of the propodosomal sensory area. The shape of this area, which proves to be of taxonomic value, exhibits some similarity to that of *N. amphibius* as figured by Hirst (1917) and Schuster (1958).

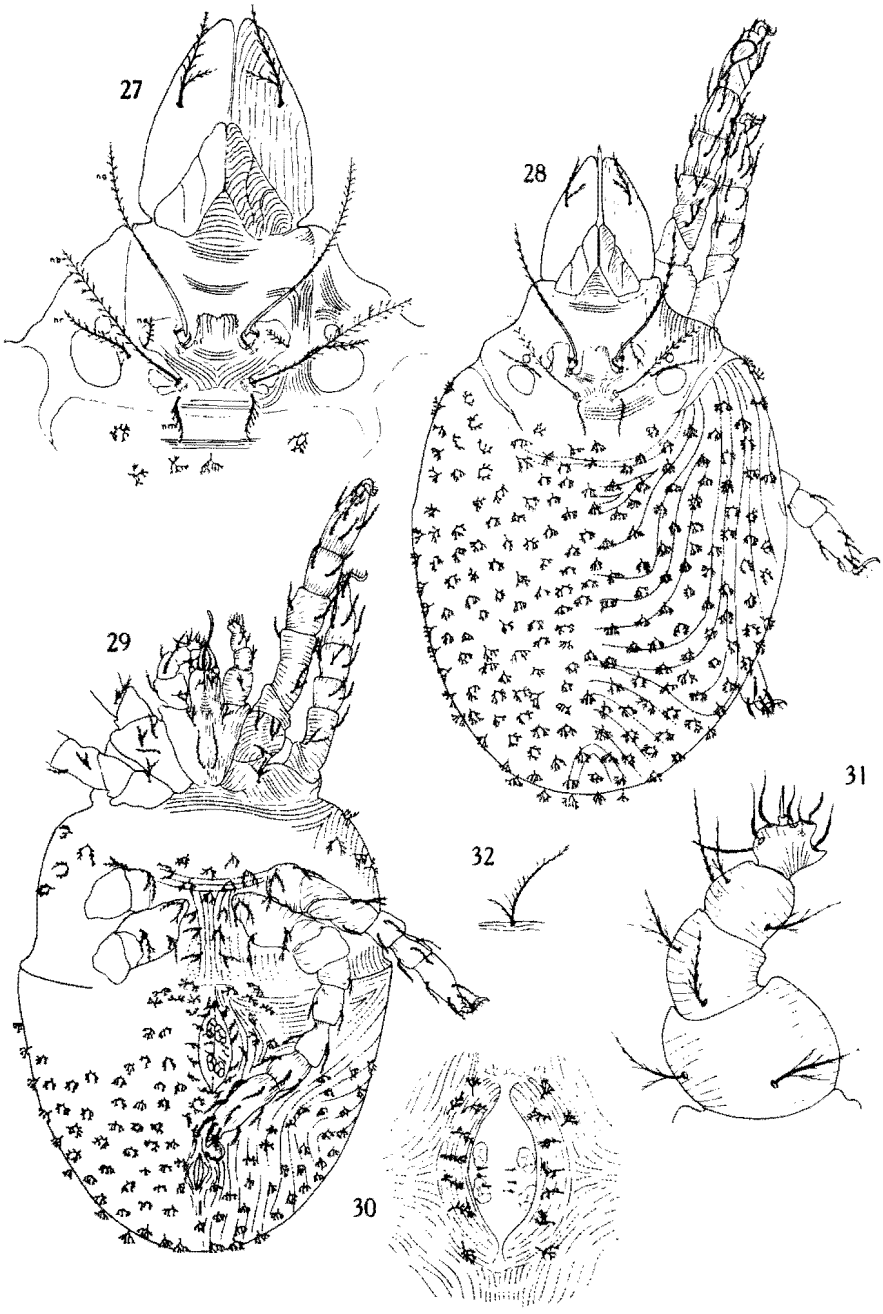
FEMALE (figs. 27-35): Dimensions: Length of body (incl. gnathosoma) 188-215μ; breadth of body 103-114μ; length of chelicerae 39-40μ.

Dorsum (figs. 27-28): The hysterosoma and the propodosoma are separated by a faint demarcation. The body striae are transverse on the propodosoma but on the hysterosoma are initially longitudinal and then turn transversely towards the midline. The striae of the sensory area, gnathosoma and legs are smooth while the rest are punctulate. The propodosoma (fig. 27) bears five pairs of setae including two pairs of relatively long ciliate sensilla and three pairs of shorter plumose setae. Sensilla *na* are much stouter but more delicately ciliate than sensilla *nb*. Setae *nm* are about two-thirds the length of setae *nr*. One pair of eyes and a pair of large post-ocular bodies are present. The hysterosoma (fig. 28) is globular and about as long as broad. About one hundred pairs of characteristically branched setae are uniformly and rather densely scattered over the hysterosoma.

Venter (fig. 29): The coxae are arranged in two groups and seem to be immovable. The genital opening (fig. 30) is situated posterior to coxae IV. The ill-defined genital covers are longitudinally striated and each bears a row of seven branched setae which have less branches than the other ventral setae. Internally, the genital opening bears three pairs of setae and two pairs of genital suckers. The genital suckers are each comprised of a few round structures. The anal opening, which is situated midway between the genitalia and the posterior tip of the body is only a small slit. The rest of the ventral idiosoma is covered by ca 65-70 pairs of branched setae; the few pairs of setae between coxae III and IV are relatively larger and have less branches than the other ventral setae.

Gnathosoma (figs 31-33): The palpi (fig. 31) consist of four movable segments which become progressively smaller from base to apex. The palpal tarsus is relatively small and bears seven finely ciliate setae and one almost transparent rodlike seta situating on a small protuberance. The chelicerae are chelate and edentate. Mid-dorsally each chelicera bears a large bifurcated seta with the anterior fork much longer than the posterior (fig. 32). The large bilobed epistome partly conceals the bases of the chelicerae. The venter of the gnathosoma (fig. 33) bears three pairs of setae. The maxillae each have three tines. Between the maxillae are two pairs of setae of which the median pair is finely ciliate. A long, tubular intermandibular organ is located between the maxillae and the chelicerae.

Legs (figs. 34-35): Femora I and IV are partially divided into basi- and telofemora. The legs are moderately covered with branched setae. The coxal and femoral setae are furcate. A microsensory seta is present dorsally on both tarsi I and II. Tarsus II (fig. 34) also bears a club-shaped, transparent solenidion lying flush with the leg. The setal formulae for the rest of the leg setae are: tarsi 17-11-8-11; tibiae 6-5-3-3; genua 5-4-3-3; femora 5-3-3-2; trochanters 0-0-0-0; coxae 3-1-2-3.



All tarsi bear a single, curved, empodial claw which has 6-8 rays on each side. The first claw is relatively smaller and less curved than the others. The leg striae are without punctulations and amongst these striae on tarsi I and II, tibiae I-III and genu I, are serpentine lines which probably have a sensory function. On both tarsus and tibia I (fig. 35) one of these lines is lightly enlarged and raised above the surface.

MALE (fig. 36). The male is essentially similar to the female and differs only in the detail of the genital opening (fig. 36). The male possesses seven pairs of internal genital setae whereas the female possesses three pairs.

DEUTONYMPH. Dimensions: Length of body (incl. gnathosoma) 148μ; breadth of body 79μ; length of chelicerae 37μ.

The hysterosoma is covered dorsally by 45-50 pairs of branched setae. Two pairs of genital suckers are present and the genital opening is flanked by three pairs of setae. The leg chaetotaxy is similar to that of the adult, except for femur II which bears only two setae.

MATERIAL STUDIED. ♀-Holotype, ♂-allotype, morphotype deutonymph, 10 ♀-paratypes and 2 ♂-paratypes from cultivated soil, Potchefstroom, Tvl., ii.1967, P. D. Theron; 5 ♀-paratypes from pasture soil, Potchefstroom, Tvl., iii.1967, P. F. S. Mulder; 6 ♀-paratypes from pasture soil, Potchefstroom, Tvl., ix.1962—ix.1963, G. C. Loots.

Nanorchestes capensis spec. nov., figs 37-38

FEMALE (fig. 37). Dimensions: Length of body (incl. gnathosoma) 133μ; breadth of body 55μ; length of chelicerae 35μ.

The only adult specimen studied is notably smaller than *N. globosus*. It can easily be distinguished from the latter species in that sensilla *nb* are densely ciliate (fig. 37). The hysterosoma is not as globular as that of *N. globosus* and it is proportionally more elongate. Setae *nr* are here relatively shorter than in the latter species and femur I is provided with only four setae.

DEUTONYMPH. Dimensions: Length of body (incl. gnathosoma) 101-114μ, breadth of body 50-60μ; length of chelicerae 32-34μ.

The deutonymph differs from that of *N. globosus* in that it is much smaller and in that sensilla *nb* are more densely ciliate.

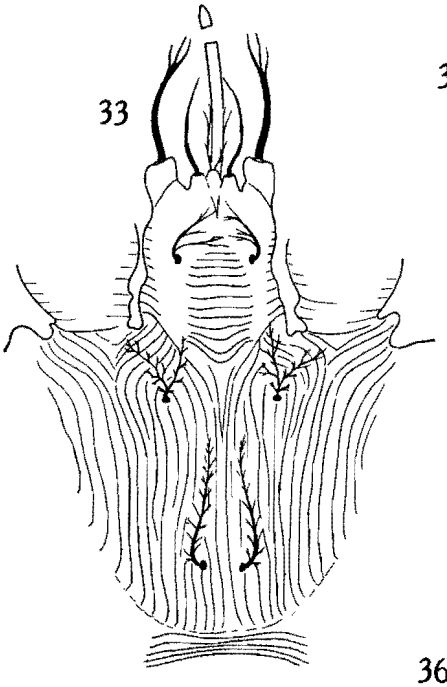
PROTONYMPH (fig. 38). Dimensions: Length of body (incl. gnathosoma) 90-98μ; breadth of body 42-55μ; length of chelicerae 30-32μ.

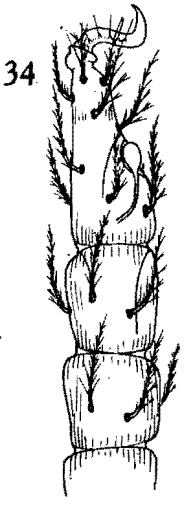
The protonymph has a squat shape, being fairly wide as compared with its length. Dorsally, the hysterosoma is provided with 20-25 pairs of branched setae which are progressively larger towards the posterior side of the body. The genital opening is provided with one pair of genital suckers and is flanked by one pair of setae. Sensilla *nb* (fig. 38) are notably more densely ciliate than in the adult.

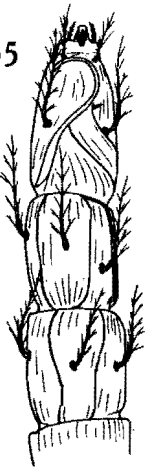
MATERIAL STUDIED. ♀-Holotype, 6 deutonymph and 4 protonymph paratypes from soil in a Port Jackson plantation, Bellville, C.P., x.1965, P. A. J. Ryke.

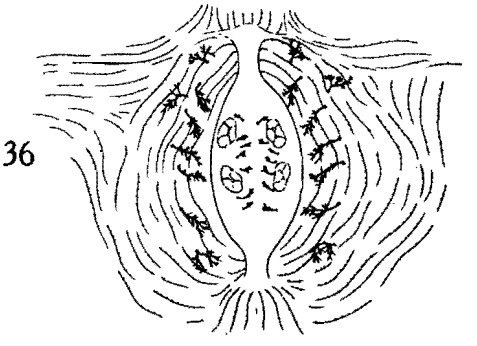
EXPLANATION OF FIGURES

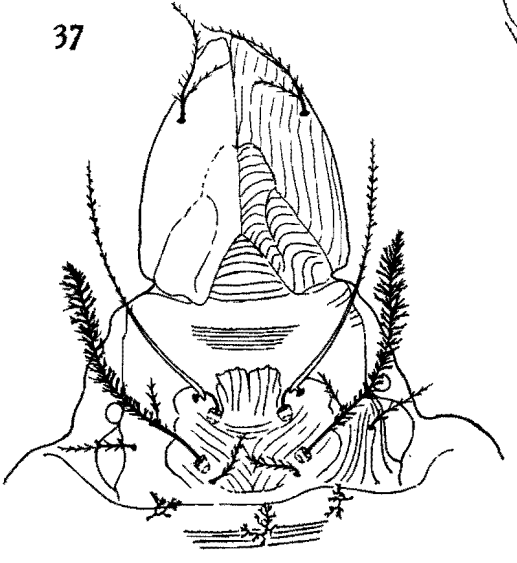
Figs. 27-32. *Nanorchestes globosus* spec. nov., female. 27. Propodosoma. 28. Dorsum. 29. Venter. 30. Genital opening. 31. Palp. 32. Dorsal cheliceral seta.











Nanorchestes usualis spec. nov., figs 39-49

This species may be recognised by the shape of the propodosomal sensory area and by the two branches of the cheliceral setae which are of equal length.

FEMALE (figs. 39-44). Dimensions: length of body (incl. gnathosoma) 178-186μ; breadth of body 103-106μ; length of chelicerae 39-40μ.

Dorsum (fig. 39): In general appearance the dorsum of this species is very similar to that of *N. globosus*. A faint demarcation separates the hysterosoma and the propodosoma. The hysterosoma bears 90-100 pairs of branched tree-like setae which are obviously more delicate than those of *N. globosus*. The striae are punctulate except for those of the sensory area, the gnathosoma and the legs. The propodosoma (fig. 39) is provided with the normal complement of setae. Sensilla *na* are very finely ciliate whilst the posterior pair (*nb*) are relatively densely ciliate. Setae *nm* are of the same length but more densely ciliate than setae *nr*. Setae *ne* is very delicate. The eyes are situated laterally to the propodosoma and is therefore difficult to observe. The sensory area is shaped and striated as in fig. 39.

Venter (fig. 40). The coxae are arranged in two groups. The genital opening (fig. 40) is situated immediately behind coxae IV and is provided with two pairs of genital suckers. The genital covers are poorly defined and each is provided with seven finely branched setae. Only two pairs of internal genital setae are present in the adult female. The small anal opening is situated midway between the genital opening and the posterior tip of the body. The rest of the ventral idiosoma is provided with *ca* 65-70 pairs of setae of which those between coxae III and IV are relatively longer than the other ventral setae. The females produce only one egg at a time.

Gnathosoma (figs. 41-42): The palpi (fig. 41) are similar to those of *N. globosus* except for the tarsal protuberance which is relatively larger. Each of the chelate chelicerae bears dorsally a bifurcate seta which has the two forks of equal length (fig. 42). The bilobed epistome is similar to that of *N. globosus*. Ventrally, the gnathosoma is provided with three pairs of setae. The maxillae are each two-tined.

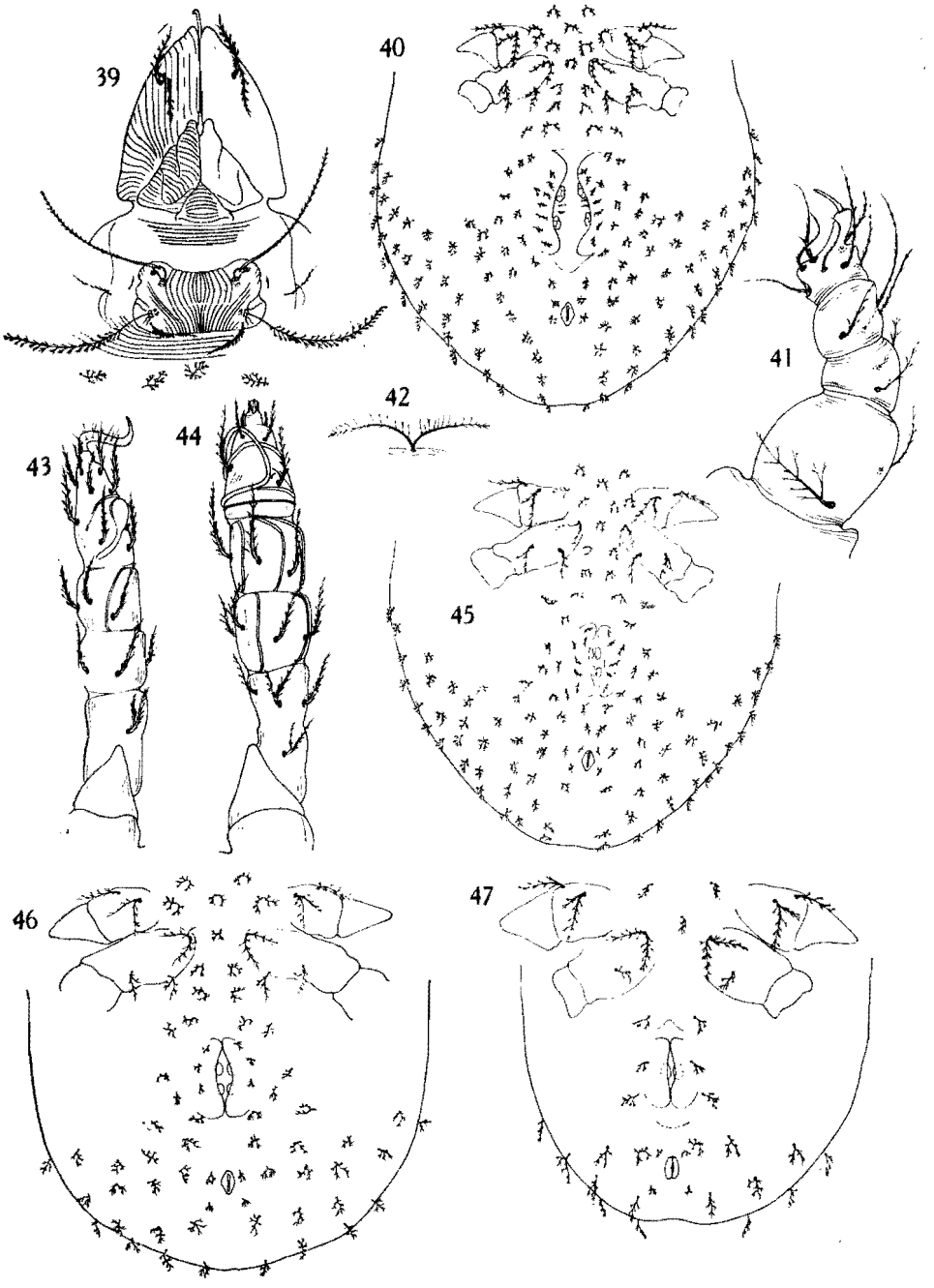
Legs (figs. 43-44): A microsensory seta is located dorsally on both tarsi I and II The solenidion on tarsus II (fig. 43) has a shorter basal stalk and a larger head than that of *N. globosus*. The setal formulae for the rest of the leg setae are: tarsi 17-11-8-11; tibiae 6-5-3-3; genua 5-4-3-3; femora 5-3-3-1; trochanters 0-0-0-0; coxae 3-1-2-3. Serpentine lines can be seen on tarsi I and II, tibiae I, II and III and genu I. As depicted in figures 43 and 44 these serpentine lines are better developed than those of *N. globosus* and some are partly detached from the leg cuticle. All tarsi bear a single curved empodial claw which has six rays on each side.

MALE: The males can be distinguished from the females by the genital opening which possesses seven pairs of internal setae.

EXPLANATION OF FIGURES

Figs. 33-36. *Nanorchestes globosus* spec. nov. 33. Venter of gnathosoma, female. 34. Leg II, female. 35. Leg I, female. 36. Genital opening, male.

Figs. 37-38. *Nanorchestes capensis* spec. nov. 37. Propodosoma, female. 38. Sensilla *nb*, protonymph.



TRITONYMPH (fig. 45): The dimensions of the tritonymph are: length of body (incl. gnathosoma) 125-141μ; breadth of body 74-87μ; length of chelicerae 37-39μ.

The tritonymphs are similar to the adults, differing in only a few respects. Dorsally, the hysterosoma is provided with *ca* 80 pairs of branched setae. The genital opening (fig. 45) is flanked by five pairs of setae and possesses two pairs of genital suckers but no internal genital setae. Two pairs of setae are situated on either side of the anal pore. A variable number of setae (*ca* 45-50 pairs) are situated on the rest of the ventral hysterosoma. The leg chaetotaxy is similar to that of the adult.

DEUTONYMPH (fig. 46): The dimensions of the deutonymph are: length of body (incl. gnathosoma) 125-133μ; breadth of body 71-82μ; length of chelicerae 37μ.

The gnathosoma is relatively large as compared with the idiosoma which has a squat shape. The dorsal hysterosoma is covered by 45-50 pairs of branched setae. The genital lips each bear a row of three branched setae (fig. 46). Two pairs of genital suckers are present. Two pairs of small branched setae are situated on either side of the anal pore. The rest of the ventral hysterosoma is provided with *ca* 27 pairs of branched setae. The leg chaetotaxy is similar to that of the adult.

PROTONYMPH (fig. 47): The dimensions of the protonymph are: length of body (incl. gnathosoma) 111-125μ; breadth of body 66-75μ; length of chelicerae 31μ.

Dorsally, the hysterosoma is provided with 20-25 pairs of branched setae. The genital opening (fig. 47) has one pair of genital suckers and is flanked by one pair of genital setae. Two pairs of small branched setae are situated on either side of the anal pore. The positions of the other ventral hysterosomal setae are depicted in figure 47. With the sensory setae in parentheses the setal formulae for the segments of the legs are: tarsi 17 (1)-11 (2)-8-7; tibiae 6-5-3-3; genua 5-4-3-1; femora 4-2-3-0; trochanters 0-0-0-0; coxae 3-1-2-2.

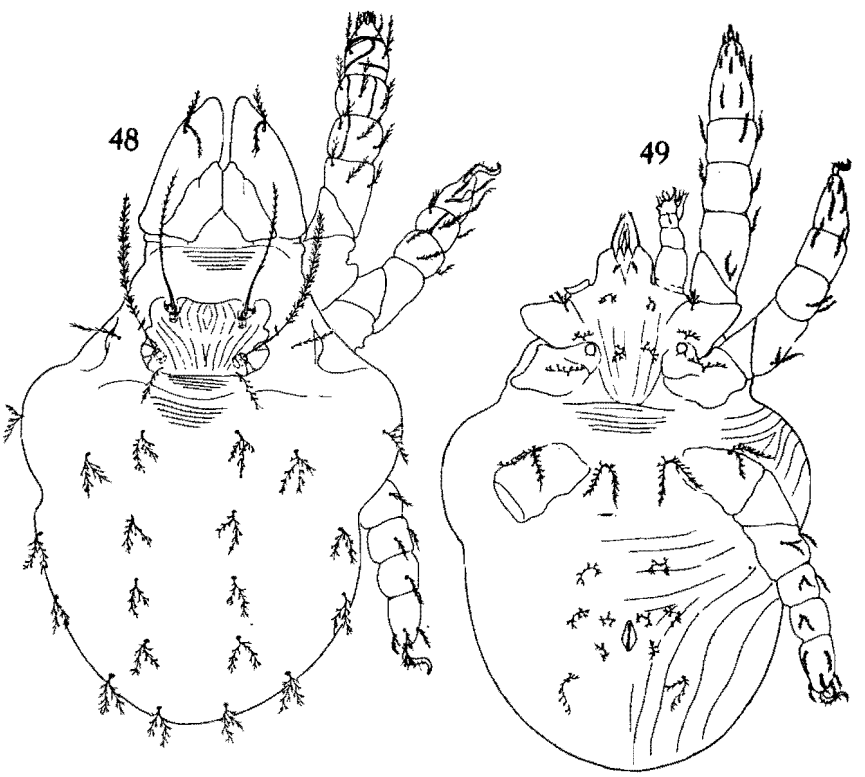
LARVA (figs. 48-49): The dimensions of the larvae are: length of body (incl. gnathosoma) 83-87μ; breadth of body 52-55μ.

Dorsally, the hysterosoma is covered by 10 pairs of branched setae which are much larger than those of the other ontogenetic stages (fig. 48). The propodosoma is identical to that of the adult. The details of the venter are depicted in figure 49. The six-legged larva lacks the genital apparatus. The anal pore is situated midway between coxae III and the posterior tip of the body and is surrounded by two pairs of setae. A pair of larval suckers are present between coxae I and II. The venter of the gnathosoma is provided with three pairs of setae. The palpi are identical to those of the adult. With the sensory setae in parentheses the formulae for the segments of the legs are: tarsi 15 (1)-10 (2)-8; tibiae 6-5-3; genua 5-4-3; femora 4-2-3; trochanters 0-0-0; coxae 2-1-1.

MATERIAL STUDIED: ♀-Holotype, 20 ♀-paratypes, ♂-allotype, 13 paratype nymphae and 1 paratype larva from porous soil with a high humus content, Potchefstroom, Tvl., ii.1968, P. D. Theron; 2 ♀-paratypes from sandy pasture soil, Welkom, O.F.S., iii.1968, P. D. Theron.

EXPLANATION OF FIGURES

Figs. 39-47. *Nanorchestes usualis* spec. nov. 39. Propodosoma, female. 40. Venter of opisthosoma, female. 41. Palp, female, 42. Dorsal cheliceral seta. 43. Leg II, female. 44. Leg I, female. 45. Venter of opisthosoma, tritonymph. 46. Venter of opisthosoma, deutonymph. 47. Venter of opisthosoma, protonymph.



Figs. 48-49. *Nanorchestes usualis* spec. nov., larva. 48. Dorsum. 49. Venter.

Nanorchestes exsertus spec. nov., figs. 50-56

Nanorchestes exsertus may be separated from the other known species by the structure of the dorsal setae, the long protruding intermandibular organ and the relatively thick tarsi and tibiae I.

FEMALE (figs. 50-56). Dimensions: length of body (incl. gnathosoma) 159-175μ; breadth of body 82-98μ; length of chelicerae 37-39μ.

Dorsum (fig. 50): The propodosoma is vaguely demarcated from the hysterosoma. The hysterosoma is small and globular and is laterally, in line with coxae IV, slightly constricted by a pair of integumental folds. The hysterosoma bears 65-80 pairs of branched setae. The branches of the dorsal setae are spread out transversely (fig. 50). The striae are punctulate. The propodosoma (fig. 50) is provided with the normal number of setae. The anterior third of sensilla *na* is finely ciliate with the anterior tips curved inwards. Sensilla *nb* are densely ciliate. Setae *nm*, which are situated anterior to sensilla *nb*, are slightly longer and more densely ciliate than setae *nr*. Setae *ne* are very delicate. The eyes are situated lateral to the propodosoma and are difficult to observe. The sensory area is peculiarly shaped and striated (fig. 50).

Venter (fig. 51): The coxae are arranged in two groups. The genital opening is provided with two pairs of relatively small suckers and two pairs of internal genital setae. The genital covers are poorly defined and each is provided with a row of five finely branched setae. The small anal pore is situated midway between the genital opening and the posterior tip of the body and is flanked by two pairs of setae. The rest of the ventral idiosoma is provided with *ca* 40-45 pairs of setae.

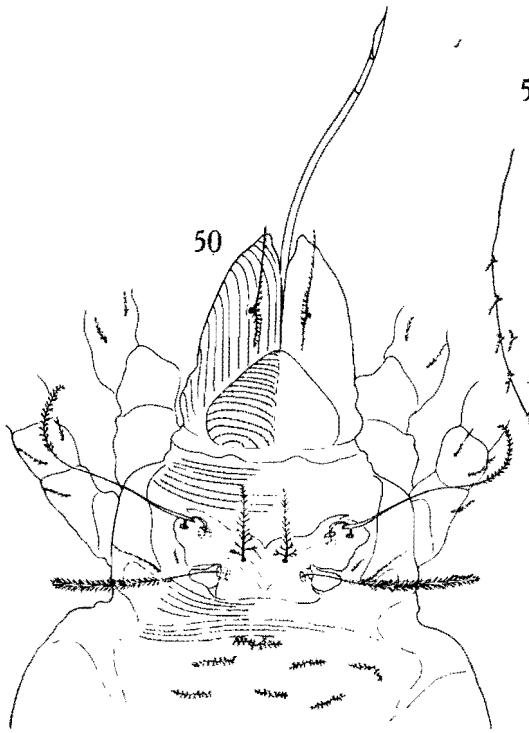
Gnathosoma (figs 52-54): The palpi (fig. 52) consist of four movable segments. The palpal tarsus bears eight setae, one of which is rodlike and situated on a small protuberance. Sensory areas are present on both the palpal tibia and tarsus. The dorsal cheliceral seta (fig. 53) is bifurcate with the anteriorly directed fork twice as long as the posterior one. The striae on the bilobed epistome are punctulate. Ventrally, the gnathosoma is provided with three pairs of setae (fig. 54). The maxillae each have two tines. Between the maxillae are a pair of nude, incurved setae and between this is a pair of smaller ciliate setae. The protruding intermandibular organ is very long and conspicuous. It is a hollow tube-like structure with an aperture close behind its anterior tip.

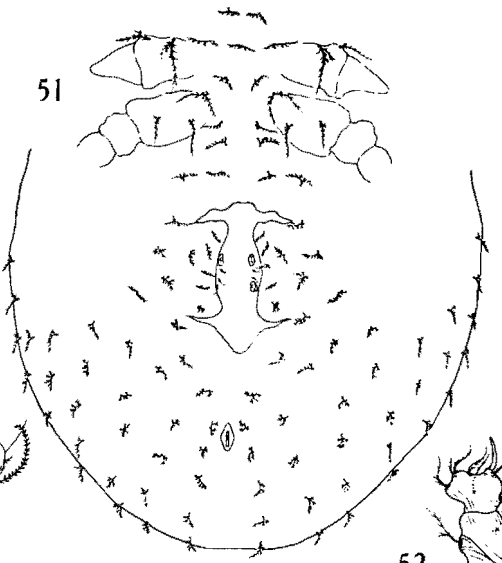
Legs (figs. 55-56): The legs are short and thick. Tibiae and tarsi I (fig. 55) are robust. Femora I and IV are partially divided into basi- and telofemora. A microsensory seta is present dorsally on tarsus I. Tarsus II (fig. 56) is provided with a similar seta and a large, club-shaped solenidion. With the sensory setae in parentheses the setal formulae for the legs are: tarsi 18 (1)-11 (2) -8-10; tibiae 6-5-3-3; genua 4-4-3-2; femora 4-3-3-2; trochanters 0-0-0-0; coxae 3-1-2-3. All tarsi bear a single, curved empodial claw which has four or five rays at each side. Serpentine lines are present on tarsi I and II, tibiae I-III and genu I. These peculiarly shaped structures are well developed (figs. 55 and 56) and some are partly detached from the leg cuticle.

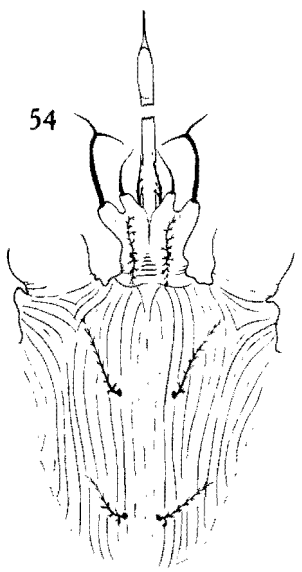
MATERIAL STUDIED: ♀-Holotype and 10 ♀-paratypes from porous soil with a high humus content, Potchefstroom, Tvl., ii.1968, P. D. Theron.

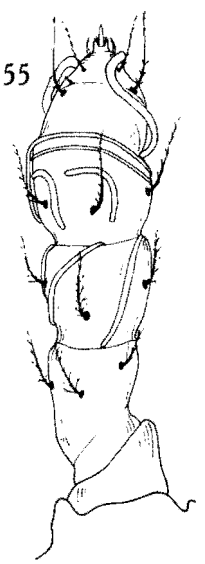
Nanorchestes africanus spec. nov., figs. 57-60

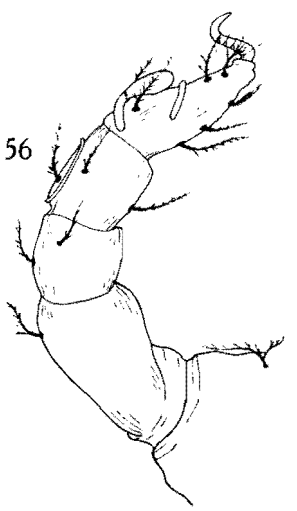
This species can be differentiated from related species by the shape of the propodosomal sensory area and the epistome.











FEMALE (figs. 57-60). Dimensions: Length of body (incl. gnathosoma) 146-180μ; breadth of body 71-98μ; length of chelicerae 37-39μ.

Dorsum (fig. 57): A faint demarcation is present between the propodosoma and the hysterosoma. The hysterosoma is slightly constricted immediately behind coxae IV. The hysterosoma is slightly elongate and is covered by about 100 pairs of small, branched, uniformly scattered setae. The integument is soft and provided with distinct striae which are punctulate on the anterior portion of the hysterosoma and on the sides of the propodosoma. The propodosoma (fig. 57) is provided with the normal number of setae. Sensilla *na* are relatively stout and moderately ciliate. Setae *nm* are relatively long, densely ciliate and situated closely behind the bases of sensilla *nb*. Setae *ne* are relatively small. One pair of eyes and a very prominent pair of postocular bodies are present The sensory area is peculiarly shaped and striated (fig 57).

Venter: The genital covers are poorly defined and each are provided with a row of seven setae Internally, the genital opening is provided with two pairs of genital suckers and three pairs of setae. Only the striae between the anterior tip of the genital opening and the gnathosoma are punctulate.

Gnathosoma (fig. 58): The palpi are similar to those of *N. usualis*. A sensory area, similar to that figured for *N. exsertus*, is present on the palpal tibia. The dorsal cheliceral seta are relatively long and not furcate. The striae on the chelicerae and epistome are prominent and without punctulations. Ventrally, the gnathosoma bears three pairs of setae (fig. 58). The prominent maxillae are each three-tined. Between them are a pair of nude, incurved setae and between the setae are another pair of setae which are provided with long cilia. The intermandibular organ is relatively short and reaches just beyond the anterior margin of the chelicerae.

Legs (figs. 59-60): The coxae are situated in two groups. A microsensory seta is present dorsally on tarsus I (fig. 59). A similar microsensory seta and a long clubshaped solenidion are present on tarsus II (fig. 60). The formulae for the rest of the leg setae are: tarsi 19-11-8-11; tibiae 6-5-3-3; genua 5-4-3-3; femora 6-3-3-3; trochanters 0-0-0-0; coxae 3-1-2-3. Serpentine lines are present on tarsi I and II, tibiae I-III and on genu I. The leg striae are not punctulate. The empodial claws are strongly curved and are partially enclosed in a sheath which bears 10-11 fine setae at each side.

MALE. Dimensions: Length of body (incl. gnathosoma) 162-179μ; breadth of body 69-81μ; length of chelicerae 37-39μ.

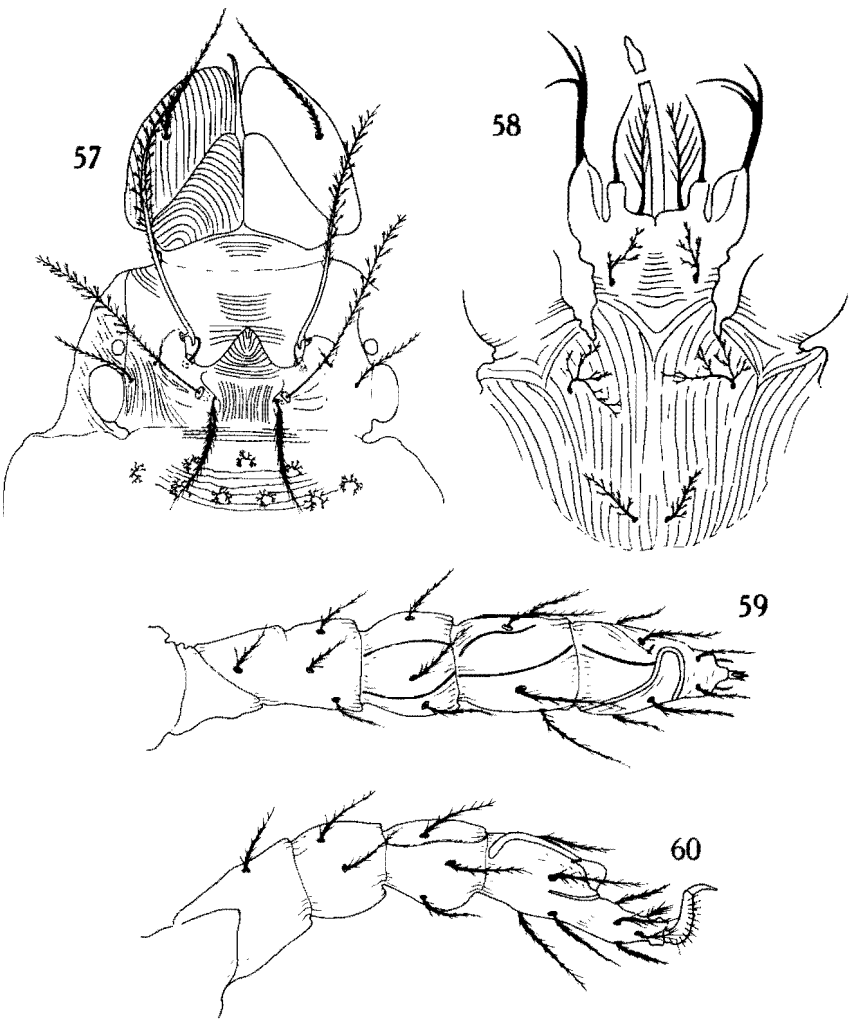
The male is similar to the female except for the genital opening which possesses seven pairs of internal genital setae.

TRITONYMPH. Dimensions: Length of body (incl. gnathosoma) 146μ; breadth of body 75μ; length of chelicerae 37μ.

Dorsum: The details of the propodosoma are similar to those of the adult. Dorsally, the hysterosoma is provided with 70-80 pairs of setae. The hysterosomal striae are faintly punctulate.

EXPLANATION OF FIGURES

Figs. 50-56. *Nanorchestes exsertus* spec. nov., female. 50. Propodosoma. 51. Venter of opisthosoma. 52. Palp. 53. Dorsal cheliceral seta. 54. Venter of gnathosoma. 55. Leg I. 56. Leg II.



Figs. 57-60. *Nanorchestes africanus* spec. nov., female. 57. Propodosoma. 58. Venter of gnathosoma. 59. Leg I. 60. Leg II.

Venter: In the only specimen studied the genital covers are provided with a row of four branched setae on one side and five setae on the other side. Two pairs of genital suckers are present. The ventral striae are faintly punctulate except for those on the genital covers. The leg chaetotaxy is identical to that of the adult except for tarsus I which bears 18 proper setae.

DEUTONYMPH. Dimensions: Length of body (incl. gnathosoma) 130μ; breadth of body 82μ; length of chelicerae 37μ.

Dorsum: The propodosoma is similar to that of the adult except for the striae between the sensory area and the epistome which are punctulate. Dorsally, the hysterosoma is provided with 45-50 pairs of setae. The hysterosomal striae are punctulate.

Venter: The genital opening is provided with two pairs of genital suckers and three pairs of genital setae. The ventral striae are punctulate except for those on the genital covers. The leg chaetotaxy is identical to that of the adult except for tarsus I which bears 17 proper setae.

MATERIAL STUDIED: ♀-Holotype and 2 ♀-paratypes from pasture soil, Potchefstroom, Tvl., ii.1967, P. F. S. Mulder; 7 ♀-paratypes and 1 paratype deutonymph from pasture soil, Potchefstroom, Tvl., ix.1962—ix.1963, G. C. Loots; 1 ♂- and 1 tritonymph paratypes from soil, Glenashley, Natal., 27.ix.1965, C. A. J. van Rensburg; 1 ♀-, 1 ♂-, 1 tritonymph and 1 deutonymph paratypes from soil, Maseru, Lesotho, iii.1966, T. S. Thelejane.

Nanorchestes pollicaris spec. nov., figs 61-64

This species can be distinguished from related species by the presence of a thumb-like protuberance on the palpal tarsus.

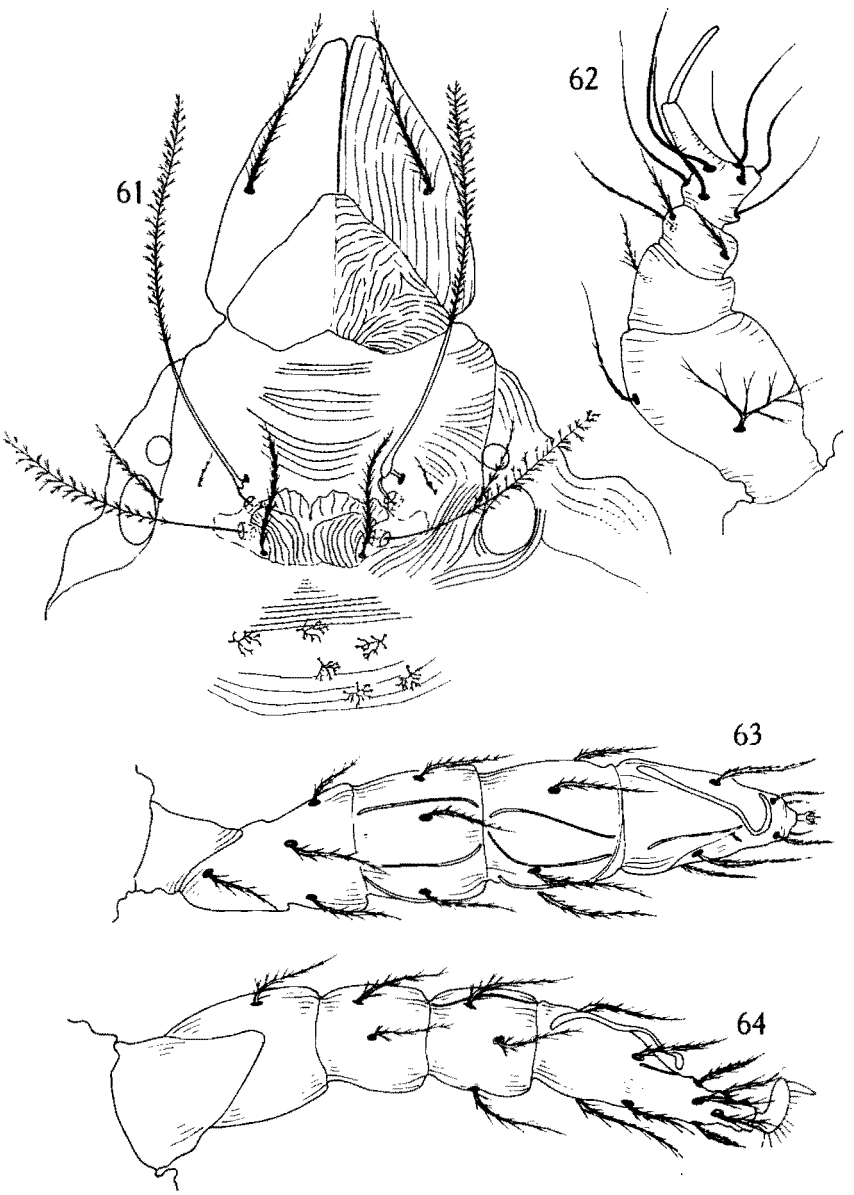
FEMALE (figs. 61-64): Dimensions: Length of body (incl. gnathosoma) 170-172μ; breadth of body 79-82μ; length of chelicerae 39μ.

Dorsum (fig. 61): The propodosoma and hysterosoma are faintly demarcated. The hysterosoma is slightly constricted laterally and immediately posterior to coxae IV. Rather more than a hundred pairs of branched tree-like setae are uniformly scattered over the hysterosoma. The hysterosomal striae are distinct and only those in the most anterior region are punctulate.

The propodosomal sensory area is peculiarly shaped and striated as in fig. 61. Sensilla *na* are stout and relatively long. Both sensilla *na* and *nb* are moderately ciliate. Setae *nm* are slightly longer than setae *nr* and are densely ciliate. One pair of eyes and a pair of postocular bodies are present.

Venter: The genital covers are poorly defined and each bears a row of seven setae. Two pairs of genital suckers and three pairs of genital seta are present. The ventral striae are distinct and only those between the anterior tip of the genital opening and the gnathosoma are punctulate.

Gnathosoma: The palpi (fig. 62) consist of four movable segments. The palpal tarsus bears seven long, curved setae and one rodlike seta situated on a thumb-like protuberance. The dorsal cheliceral seta are not furcate but are relatively long and densely ciliate. The large bilobed epistome is shaped and striated as depicted. The striae on the chelicerae, epistome and palpi are smooth. Ventrally, the gnathosoma bears three pairs of setae. The maxillae are each two-tined.



Figs. 61-64. *Nanorchestes pollicaris* spec. nov., female. 61. Propodosoma. 62. Palp. 63. Leg I. 64. Leg II.

Legs (figs. 63-64): The coxae are separated in two groups. The leg setae are relatively densely ciliate. A microsensory seta is present dorsally on both tarsus I (fig. 63) and tarsus II (fig. 64). The solenidion on tarsus II is relatively long, curved and not expanded as in the other species. The formulae for the rest of the leg setae are: tarsi 18-11-8-11; tibiae 6-5-3-3; genua 5-4-3-3; femora 6-3-3-3; trochanters 0-0-0-0; coxae 3-1-2-3. Serpentine lines, which are almost identical to those of *N. africanus* are present on tarsi I and II, tibiae I-III and genu I. The curved empodial claws are each partially enclosed by a sheath which resembles that of the genus *Speleorchestes*. The sheaths bear a a row of ten fine hairs on each side.

MATERIAL STUDIED: ♀-Holotype and 1 ♀-paratype from soil, The Bluff, Durban, Natal., 10.vi.1965, C. A. J. van Rensburg.

Nanorchestes coatesi spec. nov., figs 65-71

Nanorchestes coatesi can be recognised by the relative length of setae *nm* and the setae on the anterior portion of the hysterosoma.

FEMALE (figs. 65-71). Dimensions: Length of body (incl. gnathosoma) 146-175μ; breadth of body 87-111μ; length of chelicerae 37-42μ.

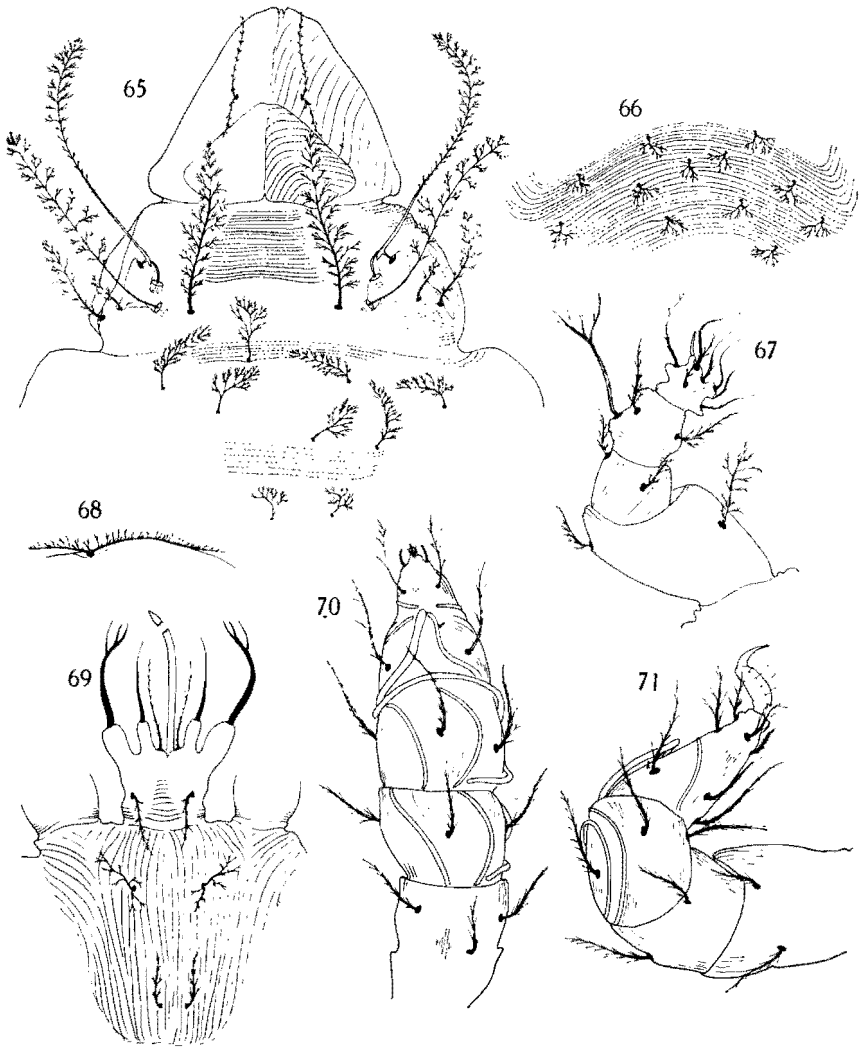
Dorsum (figs. 65-66): The shoulders of the hysterosoma are much wider and sometimes partly embracing the propodosoma. The hysterosoma is round and globular and is laterally constricted. Dorsally, the hysterosoma is covered by about 100 pairs of branched setae; those in the anterior region (fig. 65) are relatively large and elongated but posteriorly they become progressively smaller (fig. 66). The striae are fine and punctulate.

The propodosoma (fig. 65) is more than twice as wide as long and the two groups of setae are widely spaced. The propodosomal setae are all moderately branched. Setae *nm* are more than two-thirds the length of sensilla *nb*. There is no specialized sensory area on the propodosoma. The eyes are situated laterally and are difficult to detect.

Venter: The poorly defined genital covers each bear a row of seven setae. Two pairs of genital suckers and two pairs of internal genital setae are present. The ventral striae are punctulate. One of the female paratypes carried an oval shaped egg which measured 63μ in length.

Gnathosoma (figs. 67-69): The palpi (fig. 67) consist of four movable segments. The palpal tarsus bears seven finely ciliate setae and one rodlike seta situated on a small protuberance. One of the tibial setae is much enlarged. The dorsal cheliceral seta (fig. 68) is bifurcate, lying close to the chelicera and with the anterior branch more than twice as long as the posterior one. The epistomal striae are punctulate but those on the chelicerae and palpi are smooth. Ventrally, the gnathosoma (fig. 69) bears three pairs of setae. A pair of long, nude setae is situated between the three-tined maxillae and a pair of finely ciliated setae is present between the nude setae.

Legs (figs. 70-71): The legs are short, thick and sparsely haired. Coxae I-II and III-IV are separated. A microsensory seta is present dorsally on both tarsus I (fig. 70) and tarsus II (fig. 71). The solenidion on tarsus II is long and not expanded at its recurved tip. The formulae for the rest of the leg setae are: tarsi 18-11-8-11; tibiae 6-5-3-3; genua 4-4-3-2; femora 6-3-3-2; trochanters 0-0-0-0; coxae 3-1-2-3. Prominent serpentine lines occur on tarsi I and II, tibiae I-III and genu I.



Figs. 65-71. *Nanorchestes coatesi* spec. nov., female. 65. Propodosoma. 66. Posterior dorsal setae. 67. Palp. 68. Dorsal cheliceral seta. 69. Venter of gnathosoma. 70. Leg I. 71. Leg II.

The curved empodial claws are ensheathed. The sheaths on the second, third and fourth claws are prominent and with five rays on each side, while the first one is smaller and has eight rays on each side.

TRITONYMPH. Dimensions: Length of body (incl. gnathosoma) 130μ; breadth of body 85μ; length of chelicerae 35μ;

The tritonymph is very similar to the adult and differs in only a few respects. Dorsally, the hysterosoma bears 70-80 pairs of setae. Each genital cover bears a row of five setae. Two pairs of genital suckers are present and there is no internal genital setae.

MATERIAL STUDIED: ♀-Holotype, 7 ♀-paratypes and 2 paratype nymphae collected from pasture soil with a high organic content, Welkom, O.F.S., 10.x.1967, P. D. Theron.

This species is named in honour of Mr. T. J. Coates, Plant Protection Research Institute, Dept. of Agricultural Technical Services, Pretoria.

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